

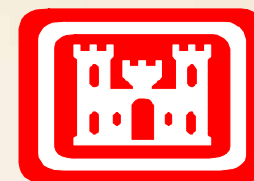


Using an XRF, RTS, and GIS-based Approach to Conduct a Dynamic Remedial Investigation at Four Small Arms Training Ranges located at Fort McClellan

Prepared for the
DOD Environmental Monitoring and Data Quality Workshop
Harrah's Reno, Nevada
May 10 – 14, 2004

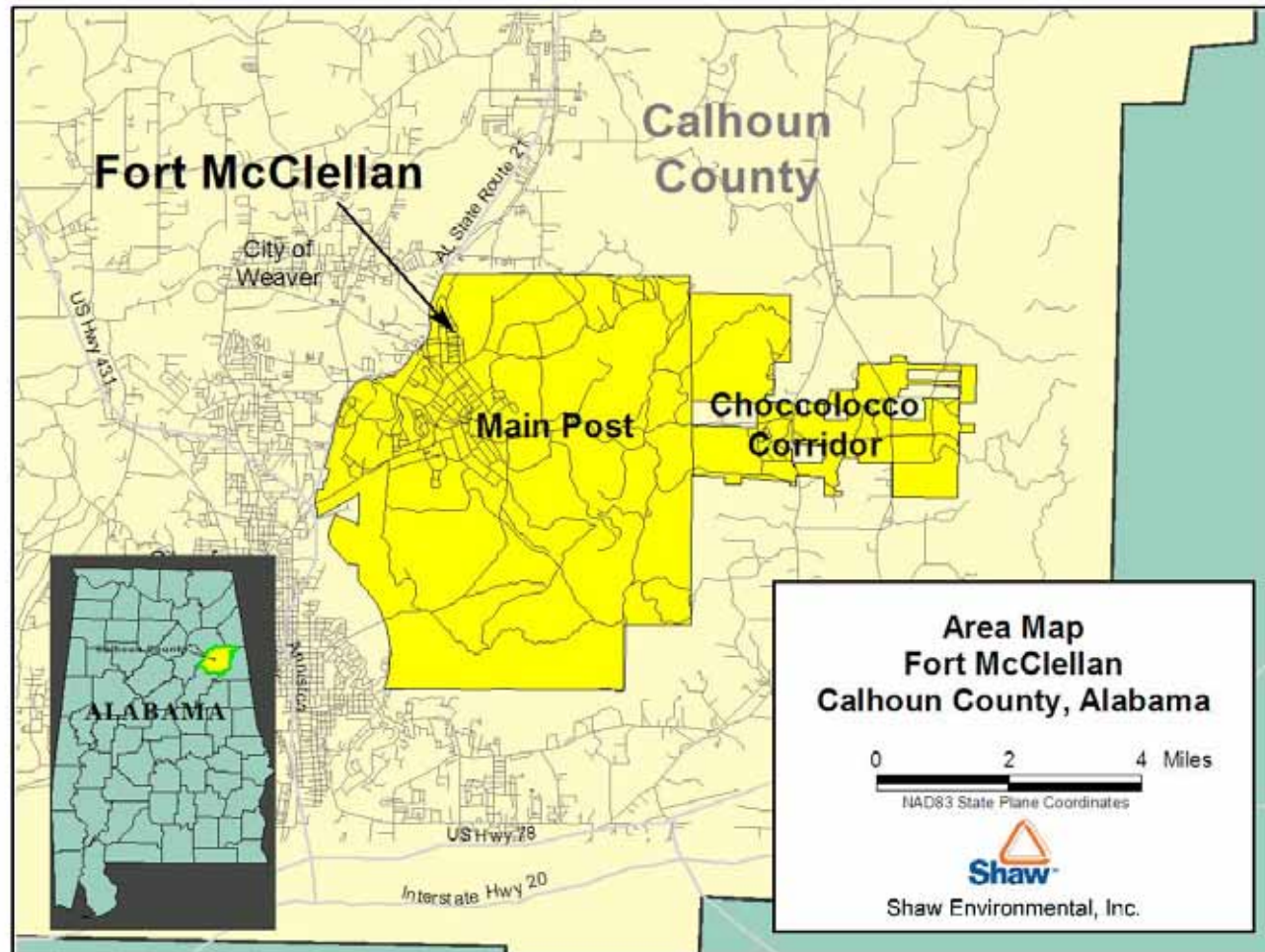
Randy McBride
Project Chemist and
Range Investigation Task
Manager

**US Army Corps
of Engineers**
Mobile District



Shaw Environmental & Infrastructure, Inc.

Fort McClellan, Alabama

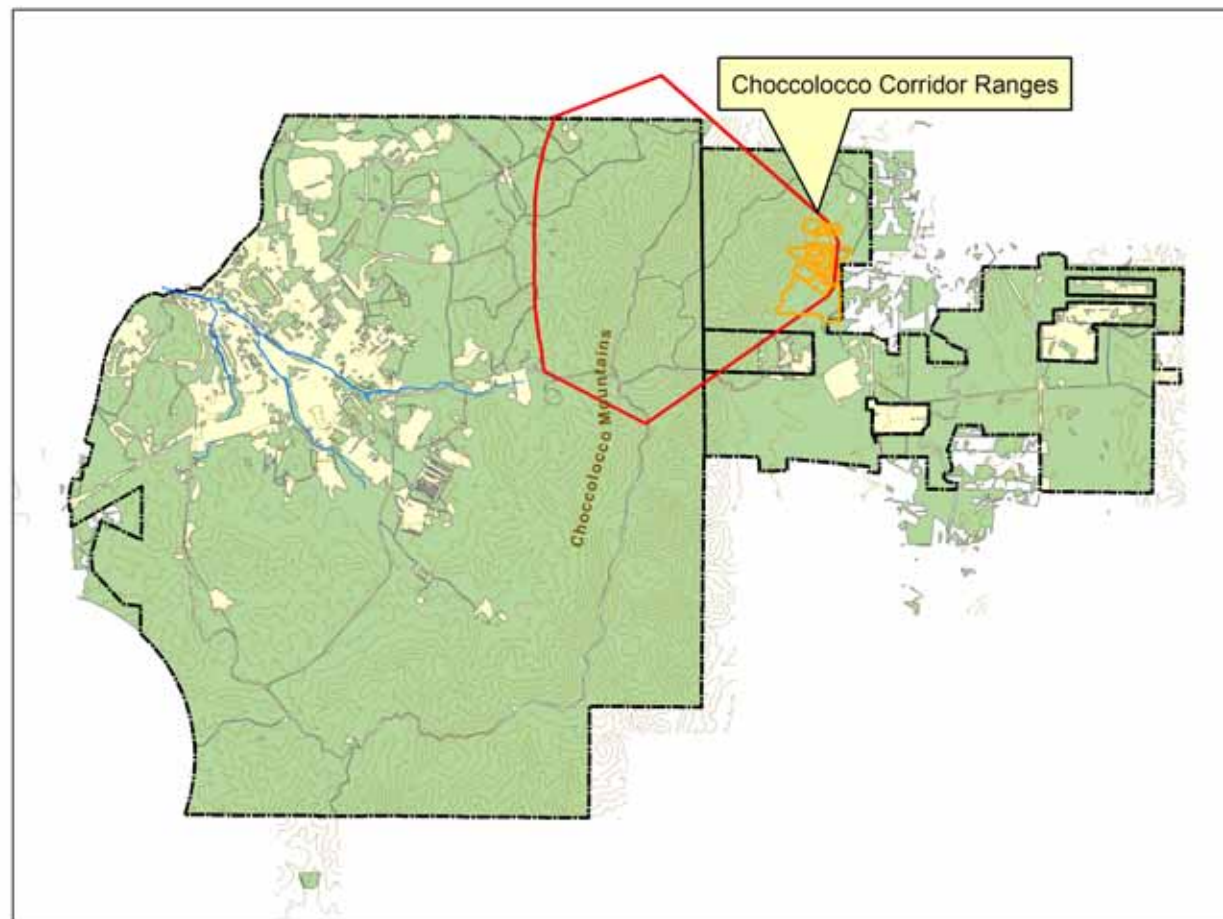


Shaw Environmental & Infrastructure, Inc.

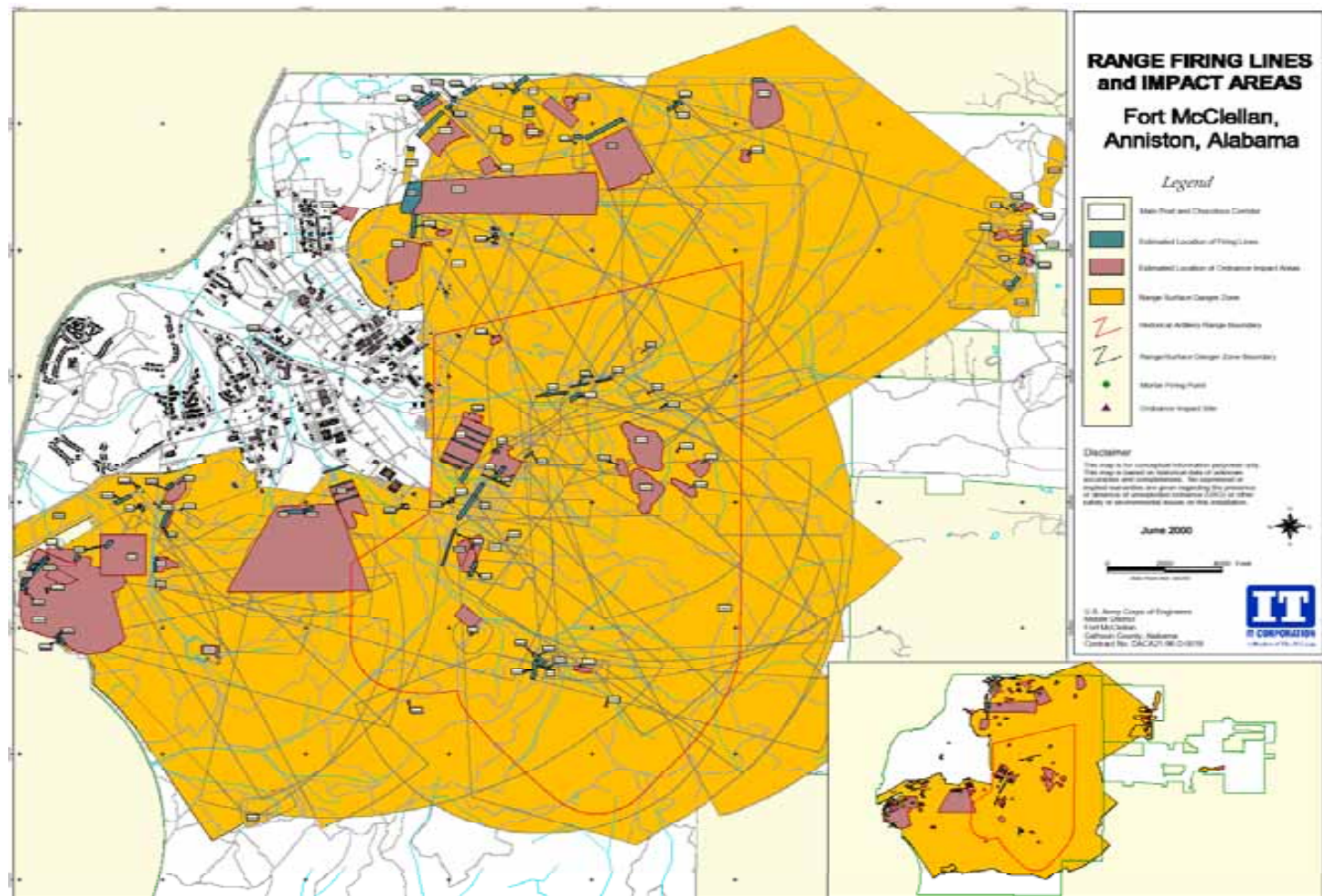
US Army Corps
of Engineers
Mobile District



Fort McClellan, Alabama



Ranges at Fort McClellan – Main Post



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



22 Ranges at FTMC Were “Active” at Closure



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Including 13 Small Arms Ranges (Pistol and Rifle)

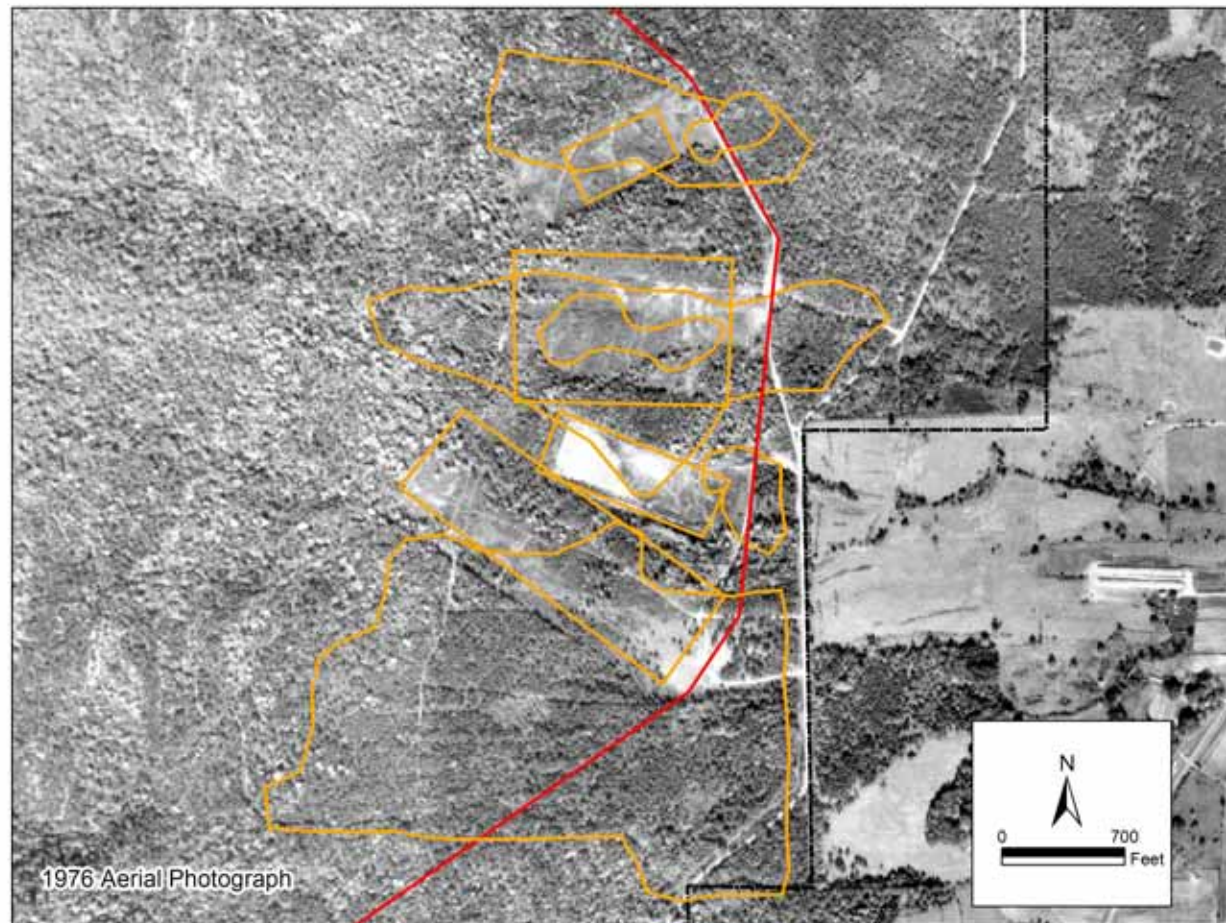


Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Choccolocco Corridor, 1976 Aerial Photo



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Choccolocco Mountains – Elevation 1,800 ft amsl



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



CC Ranges have few remaining features...

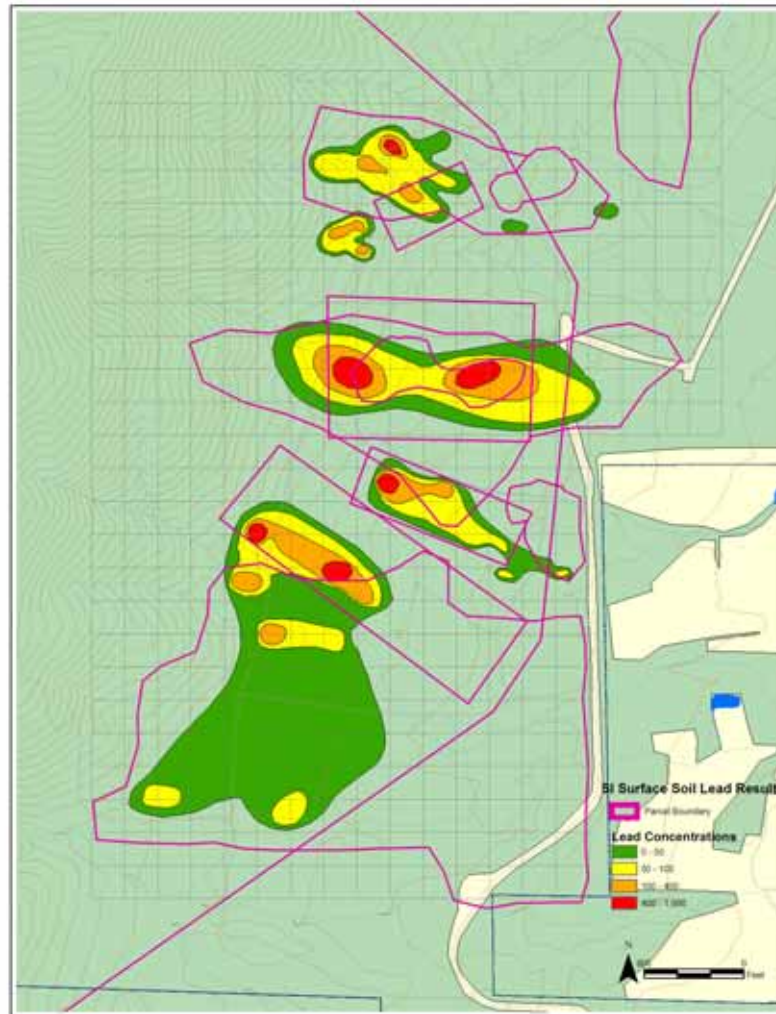


Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



CC XRF Grid/SI Data from RI Phase 1 Work Plan



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Robotic Total Station (RTS) Surveying System



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Niton X-ray Fluorescence (XRF) Instrument



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Soil Sampling at Grid Nodes



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Onsite XRF Analysis



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Archived Node Sample for QA Confirmation



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Real-Time XRF Data Capture (Hardcopy)



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



XRF Data Download, Excel Spreadsheet

Serial #XL700-U15667083LY									
BULK									
Header:									
Site: <none>									
No	XLNo	Site	Ssec	Date/Time	Pb	Pb	Error	Cu	Cu Error
2	2	Calibration	80.3	8/18/2003 12:52	<LOD		12.6	<LOD	48
3	3	Calibration	79.9	8/18/2003 12:56	404.2		33.3	<LOD	90.45
4	4	Calibration	79.6	8/18/2003 13:01	1040		50.4	99.1	56.5
5	5	Calibration	81	8/18/2003 13:06	5427.2		140	2889.6	200
6	6	W:1200, S:1400	82.6	8/18/2003 14:01	51		14.1	<LOD	65.55
7	7	W:1600, S:1400	80.5	8/18/2003 14:20	3600		94.6	132.9	51
8	8	W:1400, S:1200	80.8	8/18/2003 14:42	150.1		19.2	<LOD	63.3
9	9	W:1600, S:1200	79.9	8/18/2003 15:04	46.1		13.8	<LOD	63
10	10	W:1400, S:1000	81.8	8/18/2003 15:22	65.4		15.5	<LOD	69.45
11	11	W:1200, S:1200	80.1	8/18/2003 15:40	44		13.6	<LOD	67.35
12	12	W:1000, S:1200	80.1	8/18/2003 15:59	38.7		13.6	<LOD	66.75

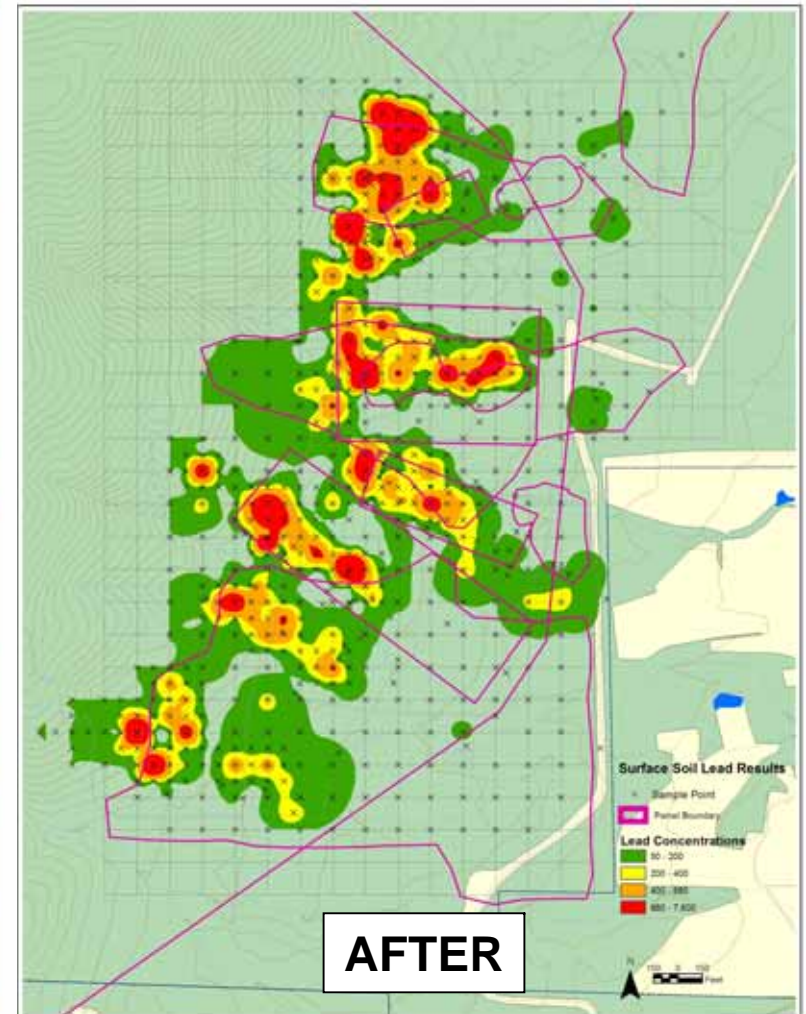
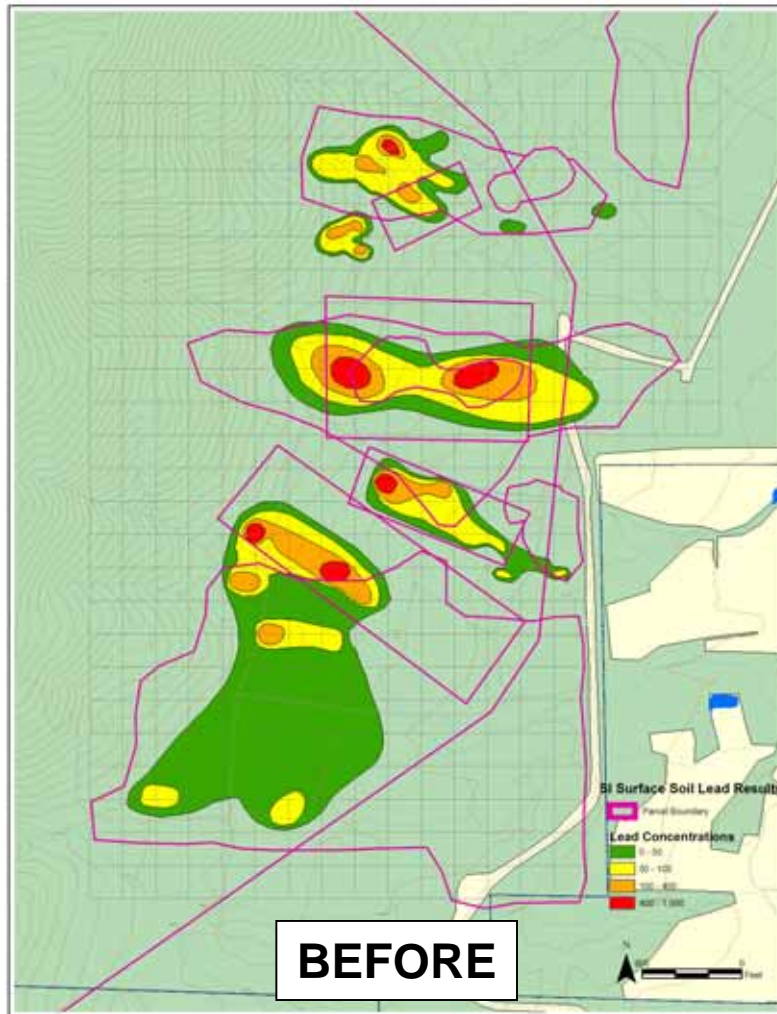


Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Before & After - Lead Contour Maps by GIS



Advantages of this Approach

- ◆ XRF as a Screening Tool
 - XRF provided consistent, accurate analytical service
- ◆ Accurate Surveying with RTS
 - Performed in a topographically rugged, remote area and under densely wooded cover with minimal tree clearing required
- ◆ Real-time GIS Support Used For:
 - Directing the field sampling efforts
 - Communicating progress to stakeholders
 - Planning and justifying Phase II RI sample locations



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District



Advantages of this Approach

- ◆ Field measurements with XRF also used on 27 total ranges at FTMC with over 1,600 samples analyzed to date. This represents an area totaling 12,700 acres. Data accepted by State and EPA.
- ◆ XRF surveys have proved to be an effective way to characterize range safety fans and eliminate them as areas of potential contamination during range RIs.
- ◆ USACE estimates cost savings during the CC Range RI to be \$270,000 over traditional sampling, offsite lab analysis approach.



Shaw Environmental & Infrastructure, Inc.

US Army Corps
of Engineers
Mobile District

